

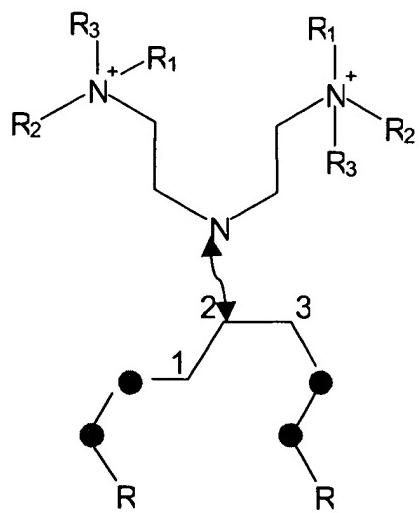
structure S'. Structure S is characterized with reduced main phase transition temperature, thus increased fluidity and high elasticity (FIG. 9). Thus, increasing the distance between the saturated acyl chains of a double-chained cationic lipid (structure S) increases the conformational disorder of the lipid, resulting in a bilayer of increased fluidity.

EXAMPLE 13

The pH-dependent dimension of the bifunctional polar head group was also simulated using semi-empirical quantum mechanical methods (FIG. 10).

Claims

1. Aqueous lipid dispersions made by double-chained cationic lipids that have a bifunctional polar head and the two hydrophobic chains composed of linear alkyl (saturated) hydrocarbons are at position 1 and 3 as shown below, for nucleic acid, peptide and other synthetic molecule drug delivery.
2. The delivery system of claim 1, and any other ingredient that is added to the system of claim 1 for activity or other technical reasons.



Structure S of cationic lipids.

$R = C_{11}H_{23}, C_{13}H_{27}, C_{15}H_{31}, C_{17}H_{35}$ (linear chains)

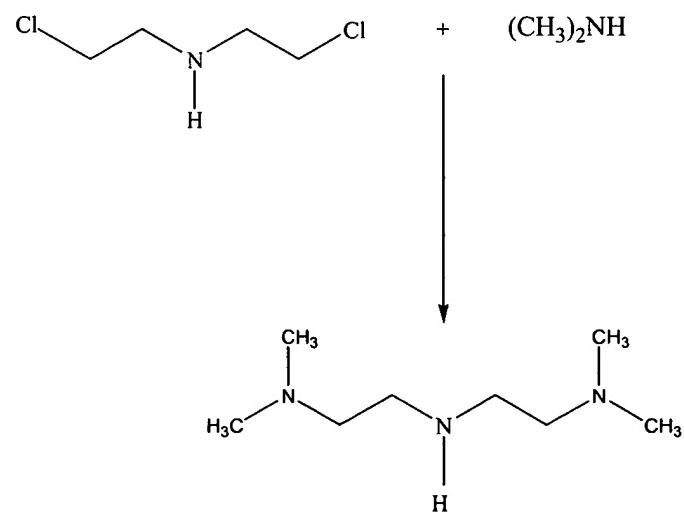
$R_1 = H, CH_3, -C(NH_2).NH$

$R_2 = H, CH_3$

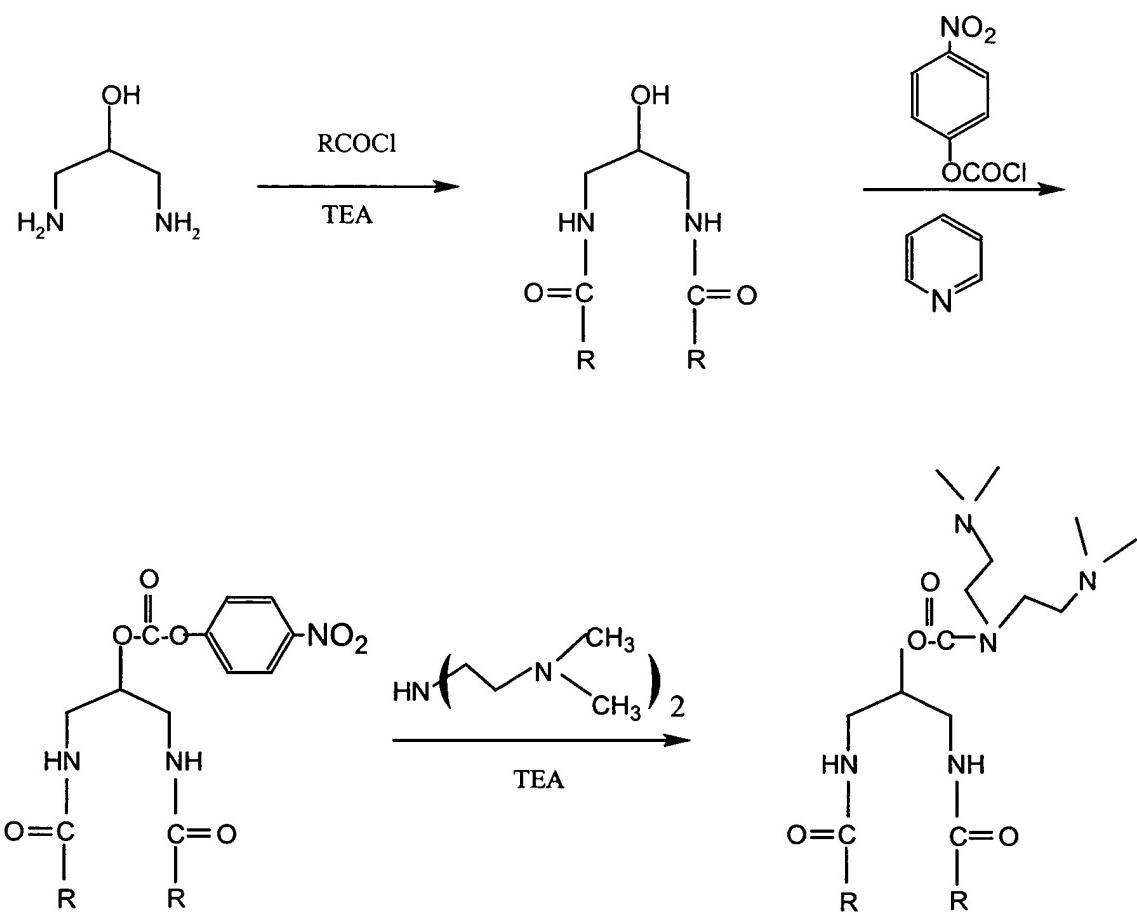
$R_3 = H, CH_3$

connector $\begin{array}{l} \uparrow \\ \downarrow \end{array} : -CH_2-, -CO-, -OCO-, CH_2CH_2, -CH_2CO-, CH_2OCO-, -CH_2CH_2CO-, \\ -CH_2CH_2OCO-$

● : $-CH_2-, -CO-, -NH-, -S-, -O-$



SCHEME I



SCHEME II